

ENGINEERING DAMAGE ASSESSMENT REPORT AND REPAIR OPINIONS

prepared for

Ian's Enterprise, LLC

regarding

**Covington Residence
17121 SE 59th Street
Choctaw, OK 73020**



**Authored by: Don Ray Sharp, PE
Report date: July 6th, 2018
Revised: July 9th, 2018**

This report was prepared for the use and dissemination by Ian's Enterprise LLC. The scope of this report is limited to the areas of the subject premises that reportedly sustained damage. The author has no responsibility for the control, correction, continuation or modification of conditions or practices except as required or expected by professional licensure. Not all areas or structures on subject premises were accessed and therefore the author does not purport to report all hazards on the property. Further, the author takes no responsibility for any injury, damage or hazard which occurred on the subject premises and which was sustained prior to his visitation and subsequent assessment.

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July 9th, 2018

As per our June 4th, 2018 authorization, an inspection was completed on June 6th, 2018 at 17121 Southeast 59th Street in Choctaw, Oklahoma at a single family dwelling (as seen in Photo 1 and Photo 2).

REPORTED INCIDENT

The property owner has stated that circa August 2017 a water discharge was discovered which had apparently leaked from the central HVAC unit condensate line. The water discharge damaged flooring throughout the residence. The month of August 2017 was especially humid and wet (as illustrated in Photo 3); Smith Brothers Heat & Air has provided a written Cause of Loss letter stating that in such conditions, an air conditioner can produce gallons of condensate per hour.

PROPERTY DESCRIPTION

The subject property is a single family dwelling located at Southeast 59th Street in Choctaw, Oklahoma County, Oklahoma. The dwelling is a wood framed, single story building with vinyl siding and brick veneer exterior with CMU (concrete masonry unit) footings. The residence is situated on a 4.65 acre parcel. Per tax records, the primary structure (as seen in Photo 4) encloses approximately 1988 sq-feet and was constructed in 2001. County records estimate a 2018 market value of \$204,500 for the residence. The property is jointly owned by Jeffery and Tammy Covington.

Per USGS soil maps (as shown in Photo 5), the soils in the area are classified as Stephenville-Darsil complex (a Class C Soil group profiled by loamy sand with a water table depth greater than 80-inches and a bedrock depth at an expected 17 to 27-inches).

OBSERVATIONS

The subject appliance that caused the water discharge is an American Standard HVAC unit (as shown in Photo 6). The area beneath the HVAC unit shows evidence of water seepage along the framing (as shown in Photo 7) and water damage to the utility closet flooring (as shown in Photo 8). Additionally, there is minor drywall damage evident.

Surface damage to the flooring is seen through approximately 30-40% of the dwelling. This damage includes delamination and spalling of the wood finish (as shown in Photo 9) as well as warping and gaps within the flooring. The flooring was not glued into place over the subfloor and gaps existed between perimeter elements at the baseboard and the sheetrock of the walls.

During inspection, the crawlspace was extremely humid and evidence of mildew and mold was witnessed in the subfloor, and to a lesser extent in the floor joists (as seen in Photo 10, 11 and 12).

CONCLUSIONS AND OPINIONS

HVAC condensate lines can easily be clogged with microbial growth (which forms a biofilm within the pipe), especially if the line is laid at too flat of a slope. While the clog was evidently correctly some time ago, there is definite evidence of water flow along the wall and framing of the utility closet. This water discharge would pool on the utility closet floor (explaining the extensive water damage in that area). Because the surface flooring was not glued, this water flow would spread out in the voids between the finish floor and the subfloor and would continue until being absorbed into the wood or seeping into the crawlspace below.

As the wood layers absorbed the water, the finish floor would swell. Because the hardwood surface was constrained laterally, the wood elements expanded vertically. Once the underlying cause of the water damage was corrected, these wooden elements began to dry, contracting both vertically and horizontally (explaining the cracks and gaps in the flooring, in the opinion of this author). As the surface layers dried, the escaping moisture created a loss of finish adhesion, causing the delamination damage witnessed.

The month of August was especially wet and humid in 2017. The condensate draining from a HVAC unit is directly related to the relative humidity. However, the humidity levels recorded by the National

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Weather Surface would not be expected to produce the levels of condensate required for the widespread damage witnessed in the residence. The engineer estimates that 110-120 gallons of water would be required, at minimum, to account for the deterioration witnessed. While this is not impossible over the course of 1 day, it is not likely. This author believes that, given the weather conditions and the size of the unit, this particular air conditioner would produce 0.50-0.75 gallons per hour (roughly 15 gallons per day).

It is the opinion of this author that the damage occurred over multiple days (and possibly several weeks). The engineer believes that once the clog manifested in the drain line of the HVAC, the property owners was oblivious to the water flow for some time. It was only after the subfloor had become fully saturated that the water discharge backed up enough to become evident on the surface. It is likely that during this time, there was continuous standing water in the utility closet, seeping into the spaces between the surface and subfloor; unless the owners had reason to open the utility closet, they would have remained oblivious to the ongoing damage.

ENGINEER'S OPINION OF REPAIR AND MITIGATION

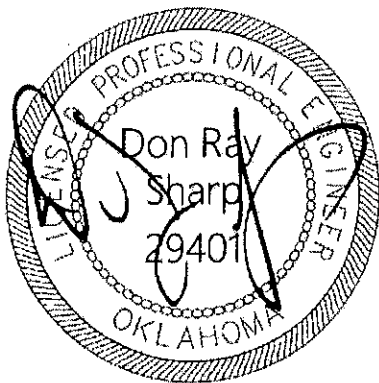
In the opinion of the engineer, the surface flooring will continue to deteriorate as the elements lose moisture content. The subfloor is contaminated with white mold and the engineer encourages replacement to prevent any health issues which may arise for the residents, as well as forestall the development of black mold (which is a much greater health concern). Additionally, structural elements supporting the subfloor should be surface cleaned and sealed with a polymer coating to prevent future wood rot.

To prevent reoccurrence, the property owner is encouraged to have the drain pipe relaid at positive slope. Additionally (or alternately), a small amount of bleach (or other microbial disinfectant) can be poured into the drain line every couple of months while the HVAC is in seasonal use. Also, before the new flooring is installed, all structural elements and the crawlspace need to be thoroughly dried. Further, it is advised that as part of the suggested repairs, the surface floor is glued to subfloor.

Thank you for the opportunity to provide these professional engineering services on this matter and the issuance of this report concludes the requested services to date. Should additional information become available, I reserve the right to revise my report based on the discovery of such additional information.

If there are any questions, comments or concerns regarding this report, or in regards to the conclusions contained within it, please do not hesitate to contact this office.

Respectfully submitted,



Don Ray Sharp, PE
Professional Engineer